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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/079,468	02/19/2002	Christopher M. Fender	399483	6678

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EXAMINER

WHALEY, PABLO S

ART UNIT	PAPER NUMBER
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1631

MAIL DATE	DELIVERY MODE
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05/01/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/079,468	FENDER ET AL.	
	Examiner	Art Unit	
	Pablo Whaley	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 8-34 is/are pending in the application.
- 4a) Of the above claim(s) 14-19 and 21-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-13 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

REQUEST FOR CONTINUED EXAMINATION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/14/2007 has been entered.

CLAIMS UNDER EXAMINATION

Claims 1-4, 8-13, and 20 are herein under examination. Claims 14-19 and 21-34 are again withdrawn. Claims 5-7 have been cancelled. Applicants' response, filed 02/14/2007, has been fully considered. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied, as necessitated by amendment. They constitute the complete set presently being applied to the instant application.

PRIORITY

Priority to US Provisional Application 60/269,474, filed 02/16/2001 has been acknowledged.

CLAIM REJECTIONS - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-4 and 8-13 are rejected under 35 U.S.C. 101 because these claims are drawn to non-statutory subject matter. According to the revised Guidelines, a claimed invention directed to a statutory process must result in (1) a practical application by physical transformation (i.e. reduction of an article to a different state or thing), or (2) a practical application that produces a concrete, tangible, and useful result [State Street Bank & Trust Co. v. Signature Financial Group Inc. CAFC 47 USPQ2d 1596 (1998)], [AT&T Corp. v. Excel Communications Inc. (CAFC 50 USPQ2d 1447 (1999))]. The revised Guidelines also state that the focus is "not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather on whether the final result achieved by the claimed invention is useful, tangible, and concrete."

The instant claims are directed to a method for predicting the soybean cyst nematode resistance of a soybean sample. Claim 1 specifically results in a step of "predicting the soybean nematode resistance...based upon the comparison results." Thus, the claimed method does not result in a physical transformation of matter, as this claimed result directing to "predicting" encompasses a non-physical method step that may be practiced inside of a computer (i.e. *in-silico*). Where a claimed method does not result in a physical transformation of matter, it may be statutory where it recites a result that is concrete (i.e. reproducible), tangible (i.e. communicated

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to a user), and useful result (i.e. a specific and substantial). For the above reasons, the instant claims lack a "tangible" result and thus do not recite more than a 35 U.S.C. 101 judicial exception. Therefore, the instant claims are not statutory.

This rejection could be overcome by amending the claims to recite a step wherein the result of the claimed method is communicated to a user (i.e. real world result), graphically displayed, or output (e.g. to a user, to a memory, or to another computer). For an updated discussion of statutory considerations, see the revised Guidelines for Patent Eligible Subject Matter in the MPEP 2106, Section IV (Latest Revision August 2006).

CLAIM REJECTIONS - 35 USC § 112, 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 and 8-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 4 are rejected for the following reasons. Claims which are directly or indirectly dependent from claim(s) 1 are also included as rejected herein, due to said dependence.

Claim 1, step b), recites the limitation "wherein the step (b) of comparing includes using a discriminant analysis based upon the predictive model." As written, it is unclear whether said "using a discriminant analysis based upon the predictive model" is intended to be an active method step to be practiced in addition to step b), a further limitation of said comparing as

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recited in step b), or an intended use. If the later, claim 1 is indefinite as it merely recites a use without any active, positive steps delimiting how this use is actually practiced. Clarification is requested via clearer claim language.

Claim 1, step c), recites the limitation "predicting the...resistance...based upon the comparison results." As claim 1, step b), recites "comparing the assay spectra with a predictive model" wherein comparing includes using a discriminant analysis by "comparing peak intensity", it is unclear which comparison results claim 1, step c), requires for predicting soybean resistance. Clarification is requested via clearer claim language.

Claim 4 recites the limitation "wherein the comparison results in step (b) are based upon a visual comparison." As parent claim 1, step b), recites "comparing the assay spectra with a predictive model" as well as "comparing peak intensity", it is unclear which comparison result claim 4 is intended to further limit. Clarification is requested via clearer claim language.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 1-4, 8, 10-13, and 20 are rejected under 35 U.S.C. 103(a) as being obvious by in view of Qiu et al. (Theor. Appl. Genet., 1999, Vol. 98, p.356-364), in view of Robinson et al. (Revue Nematol., 1988, Vol. 11, No. 1, p.99-107) and Bewig et al. (JAOCS, 1998, Vol. 71, no. 2, p.195-200).

Applicant's arguments, filed 02/14/2007, that neither Qiu et al. nor Malins et al. teach or suggest the limitation wherein the assay spectra obtained from soybean samples compared with known resistance or susceptibility to SCN to predict the SCN resistance of the soybean sample based on the comparison results, and that it would not be obvious to one of skill in the art would to combine the above references in view of a Declaration by David Sleper have been considered but are moot in view of the new ground(s) of rejection.

Qiu et al. teach markers associated with soybean cyst nematode resistance, and markers associated with SCN susceptibility [Abstract]. Qui et al. teach methods for obtaining NIR spectroscopy scans of soybean samples for use in statistical analysis [p.358, Col. 1, ¶ 1 and 2], and peak analysis of MAPMAKER-QTL scans of genomic regions associated with SCN resistance and putative regions for conferring SCN resistance [Fig. 3] and [p.358, Col. 2, ¶ 3], as recited in claims 1, 12, and 20, and as discussed in the previous office action mailed 6/17/2005.

Qiu et al. do not specifically teach using spectral data obtained from soybean samples to predict the SCN resistance of the soybean sample based on the comparison results, as in claims 1, 12, and 20.

Robinson et al. teach the use of fluorescent microscopy for characterization of hypersensitive reactions in susceptible and resistance potato cyst nematodes [Abstract], as in

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claims 1, 12, and 20. More specifically, Robinson et al. teach obtaining spectroscopic scans [Fig. 3] and comparing quantified fluorescence among host-parasite combinations to determine resistance [Abstract, Table 1, and Table 2], providing evidence that resistance can be determined by comparing spectroscopic data, as in claims 1, 12, and 20.

Qiu et al. do not specifically teach the use of discriminant analysis applied to spectral data for predicting nematode resistance, as in claims 1, 12, and 20. However, Qiu et al. do teach statistical analysis of scans of different genomic regions of SCN resistant loci [Fig. 3], which suggests discriminant analysis of spectral data (i.e. scanned data).

Bewig et al. teach a method for predicting vegetable oil types in unknown samples using discriminant analysis of NIR spectroscopy data [Abstract]. Bewig et al. teach the following aspects of the instantly claimed invention: obtaining assay spectra of 46 vegetable oil samples over a predetermined frequency range [p.195, Col. 2, ¶ 5] and [Fig. 4]; logarithmic transformation of NIR data (i.e. reflectance) to obtain transformed data [Fig. 1]; obtaining spectroscopic scans of a reference soybean oil samples (i.e. known samples) [p.198, Col. 2, ¶ 1] and correlating them with spectra samples using a Mahalanobis distance model (i.e. predictive model) and discriminant analysis equations for determining specific spectral differences and classification [p.196, Col. 1, ¶ 2 and 3] and [p.196, Col. 2, ¶ 4 and 5]; and predicting unknown samples based on classification of spectral data results obtained from discriminant analysis [Fig. 5] and [Table 1 and 2]. Therefore, Bewig et al. teach the limitations of instant claims 1, 12, and 20. Bewig et al. also teach analysis of soybean oil [Abstract], which is an implicit teaching for "soybean seed", as in claims 2, 3, and 13, since oil is known to be extracted from seeds. Bewig et al. also teach graphical classification of results of discrimination results [Fig. 5] as well as tables indicating predicted classification results [Tables 1 and 2], thereby making obvious the visual comparison recited in claim 4. The Examiner has broadly

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interpreted the Mahalanobis model taught by Bewig et al., above, as an intelligent algorithm, as in claim 8. Bewig et al. also teach the NIR predetermined frequency range [p.195, Col. 2, ¶ 5], as in claims 10 and 11. Bewig et al. also teach a discriminant analysis computer program (IDAS) for implementing the above method [p.196, Col. 1, ¶ 1], which is a teaching for machine readable code, as in claim 20.

Thus it would have been obvious to someone of ordinary skill in the art at the time of the instant invention to practice the method of Robinson et al. using the spectral discriminant analysis model of Bewig et al. and the NIR scans of SCN-resistant and SCN-susceptible soybean samples taught by Qui et al., where the motivation would have been use a rapid low-cost nondestructive technique for discriminating SCN resistance in soybean samples [Bewig et al., p.195, Col. 2, ¶ 2], resulting in the practice of the instant claimed invention. Furthermore, motivation to combine the above references is provided by Qui et al., who also teach the relationship between soybean oil, polygenic traits, and SCN resistance [p.357, Col. ¶ 3] and [Table 1]. One skilled in the art would reasonably have expected success in combining the teachings of Robinson et al., Bewig et al., and Qui et al. as both Robinson et al. clearly teaches that nematode resistance can be determined using spectral analysis [Abstract]. Furthermore, Bewig et al. clearly teach the classification of different types of samples using spectral data [Abstract].

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Claims 1-4, 8-13, and 20 are rejected under 35 U.S.C. 103(a) as being obvious by in view of Qiu et al. (Theor. Appl. Genet., 1999, Vol. 98, p.356-364), in view of Robinson et al. (Revue Nematol., 1988, Vol. 11, No. 1, p.99-107) and Bewig et al. (JAOCS, 1998, Vol. 71, no. 2, p.195-200), as applied to claims 1-4, 8, 10-13, and 20, and further in view of Borggaard et al. (Anal. Chem. 1992, 64:545-551).

Applicant's arguments, filed 02/14/2007, with regards to Borggaard et al. have been considered but are moot in view of the new ground(s) of rejection.

Robinson et al., Qiu et al., and Bewig et al., make obvious a method for predicting the soybean cyst nematode resistance of a soybean sample, as set forth above.

Robinson et al., Qiu et al., and Bewig et al. do not specifically teach the predictive models as recited in claim 9. However, Bewig et al. and Qiu et al. clearly teach multivariate predictive algorithms and discriminatory analysis models [Bewig et al., p.195, Col. 1, ¶ 2].

Borggaard et al. teach the use of neural networks for optimally interpreting NIR spectra for classifying samples [Abstract and p. 546, Section I], as in claim 9. More specifically, said neural networks are used to compare results and predict fat in homogenized meat products using NIR spectral data [Table II] and [Fig. 6].

Thus it would have been obvious to someone of ordinary skill in the art at the time of the instant invention to combine the method of Robinson et al., the discriminant analysis method of Bewig et al., and the soybean NIR data taught by Qiu et al. with the added feature of a neural network model of Borggaard et al., where the use of a neural network for training and analysis of soybean NIR spectral data would result in an improved method for predicting SCN resistance by reducing spectral noise [Borggaard et al., p.550, Section VIII]. One skilled in the art would

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reasonably have expected success in combining the above references as all teach spectral analysis of NIR data.

CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached on 9:30am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached at 571-272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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